Preface

Significance of the ERP Phenomenon

Enterprise resource planning (ERP) was a major success story of the 1990s. By 1998, 40 percent of multinational organizations with a turnover of $1 billion had replaced their outdated "legacy systems" with an ERP system, hoping to achieve integration across functions and departments. The trend of ERP adoption has continued into higher education around the world, with a substantial number of implementations. Although famous failures have been reported in the press (Gilbert, 2004), very few studies of ERP implementations in a university environment have been presented in the literature.

Universities are medium to large organizations with significant export capabilities. For example, Griffith University in Australia, which is the research site for six of the case studies in this book, has twice won the state's export award in recognition of its contribution to the nation's export industry. We expect the findings reported in this book to be relevant to other industries of similar standing in the country's economy.

There is a relatively small number of scholarly publications within the information systems (IS) community on ERP systems compared to the size of the business they generate (Esteves & Pastor, 2001). Esteves and Pastor even claimed in their annotated bibliography of ERP literature that research on ERP systems has been treated as a "secondary" and neglected by the IS community (p. 3). Other researchers also argued the need for more investigations into ERP (Allen & Kern, 2001; Gable, 1998).

The lack of publications discussing the ERP implementation and use of an ERP system within a university environment is clear. One of the few papers was based in the United Kingdom and was written by Allen and Kern (2001). This book addresses this gap in the IS literature, with discussion of ERP implementation cases on three continents.

The ERP Implementation

ERPs evolved from materials requirements planning (MRP) systems, initiated in the 1970s to reduce inventories, lead times, and costs; improve market responsiveness; improve control; and improve organizational communication (Light, Holland, Kelly, & Wills, 2000). MRP later evolved to materials resource planning (MRP II) and then to enterprise resource planning (ERP), which attempts to integrate systems holistically across an organization with the aims of improving productivity, reducing costs, and aiding in planning (Ascompt Technologies, 2001). The evolution of ERP systems continues into new markets with the extension of interorganizational processes, such as supply chain management and customer relationship management (Hillegersberg & Kumar, 2000). Siau and Messersmith (2003) suggested that the next generation of ERP will need to evolve further, with support for multiple linked organizations across multiple sites incorporating technologies for mobile commerce, with advances in 24–7 availability, security, maintainability, and data sharing and integration.

A "silver bullet" ERPs are not. The implementation of ERP is problematic because of the packaged nature of the software. Packaged software should, if successfully implemented, satisfy the different information needs of different organizations and users in different industries and release the burden of maintaining the companies' "legacy systems" (Swanson, 2003). However, the cross-industry definition of "best practice" of an ERP system does not guarantee a problem-free implementation, because an organization has to adjust its business processes to fit the package or build extra functionality around the package, often requiring a consulting company's help and guidance through the implementation.

Packaged business software has long been in use. Its popularity escalated along with the advent of personal computers. Research that was carried out among small companies prior to the rise of the use of ERP packages in large organizations indicated that although by acquiring a "shrink-wrapped" software package a small company may avoid costly development of a general-purpose business package, the users required a lot of help in order to be fully satisfied with the package (von Hellens, 1991).

The life cycle of ERP implementation first focuses on mapping the organization's information requirements to the processes and terminology employed by the software vendor and setting the software system parameters to suit the organization. Tailoring the package and adjusting existing organizational processes to fit the software then follows. Adjusting software to the organization is a major undertaking and is beyond what many information technology (IT) departments can offer; therefore, the implementation is often outsourced. This means that the organizations that purchase an ERP system enter into long term relationships with both the software vendor and the implementation company. It is not

surprising that major consulting companies found ERP to be a significant source of business (Swanson, 2003).

When successfully implemented, ERPs can offer operational, managerial, and strategic benefits. They are often promoted as being the solution for organizational IT integration problems (Siau & Messersmith, 2003) and a way to centralize data for improved decision making. Organizations reaping these benefits were reported; however, cases reporting failures are more prevalent. Criticisms of ERP systems include their significant up front investments, lengthy and error prone customizations, and mediocre results. Other identified critical success factors include top management support, project champions, teamwork and composition, project management, and change management and culture (Fui-Hoon Nah, Zuckweller, & Lee-Shang Lau, 2003). Whether the result is a success or a failure, and inconsequential of whether or not this specific projected amount is accurate, the monetary costs are clear. According to Al-Mashari (2003), it was projected in 1998 that in 2002, "organizations' total spending on ERP applications would reach $72.63 billion." Al Mashari also suggested that it is now more urgent than ever to establish a research agenda to help us to understand the issues surrounding an unsuccessful (and successful) implementation.

The expected adherence to the best practices encouraged by ERPs can cause confusion in organizations (Siau & Messersmith, 2003), as best practice is a subjective term and, as with success, is often measured by various people according to different criteria. Adding to this confusion are the attempts at adjusting ERP for organizational fit, a factor that is particularly relevant to the adoption by higher education institutes. ERPs have been developed for private-sector corporate organizations, with little effort made to fit them to universities, except for making available a student administration system.

Entry of ERP into Higher Education

A recent special issue of the *International Journal of Human–Computer Interaction* focused on ERP management and social and organizational issues. Of particular interest is the article by Siau and Messersmith (2003) that examines the end-user perspective of an ERP implementation in a public university. The user focus and particular context (public university) explored in Siau and Messersmith's (2003) article provide a detailed discussion, one of the few presented in the literature. A number of the discussions presented in this book provide a similar perspective. The primary context for discussion is the public higher education sector, particularly the university sector. Qualitative studies of

this nature have been clearly missing from the literature on IS, in comparison to the very large costs and revenues that ERP systems generate (Esteves & Pastor, 2001). Organizations are only now realizing the need to constantly update and maintain their implemented ERP systems and the significant costs of keeping up with the rate of business change. The criticality of these factors is evident across the cases presented in this book.

It is suggested that an influential factor essential for success is the integration of end-users into the implementation process (Siau & Messersmith, 2003). End users are commonly viewed as passive participants in ERP implementations. The impact of not involving them in this type of complex, difficult, and often lengthy implementation could result in user resistance far more severe than can be predicted. Universities such as Royal Melbourne Institute of Technology in Melbourne, Australia, have almost reached breaking point, while other universities are engaging in legal actions against vendors and consulting companies (Gilbert, 2004).

Following the example of large corporations, universities are increasingly replacing their management and administration computer systems. Universities' problems are similar to those of a wide range of organizations, and the standard tools of contemporary organizational analysis and institutional management can be similarly applied. These tools include computer systems such as ERP software (Pollock & Cornford, 2004).

ERP vendors and implementation consultants tailored their products for new markets, with the higher education sector being one of the emerging adopting industries. PeopleSoft® is the leading ERP vendor for the university sector (Wieder, 1999). PeopleSoft ERP has a strong position in the market of human resource management, and within the university environment, often complements this module with a financial and student administration module. Many universities worldwide (McCredie & Updegrove, 1999) and in Australia (Beekhuyzen, Goodwin, & Nielsen, 2002) adopted an ERP solution in order to cope with the changing environment of the higher education sector (Noble, 1998; Crase, Freund, Liu, Mahoney, & Pasternack, 2000; Brown, 2002). Little research has been conducted regarding ERP implementations in the university environment, compared to the actual number of ERP implementations in the higher education sector worldwide (Orgill & Swartz, 2000), and specifically in Australia (CAUDIT, 2001).

Reported factors that limited the implementation success of these projects include budget overruns and lack of functionality (Lawnham, 2001; Brown, 2002; Madden, 2002). Oliver and Romm (2000) investigated why universities wanted to adopt ERP systems, but the shortcoming of this research was that it consisted of secondary research data, collected through Web sites of the ERP projects at universities in Australia and the United States. Mahrer's (1999) research investigated the impact an ERP system can have on a university. The

researcher reported on a successful ERP implementation in a Swiss university and thought strong communication and coherence between the departments in the university comprised the primary factor for success.

Universities face the typical ERP obstacle of how much customization should be done to the ERP package to fit the organization, or conversely, how can the university initiate changes in order to fit the organization to the ERP package (Cornford & Pollock, 2001). ERP systems are based on "best business practices," which are "defined structures of doing business operations" that the implementing organization can choose to exploit (Davenport, 1998; O'Leary, 2000). Lozinsky and Wahl (1998) made the same claim as the ERP vendors selling these packages — that they have "universal applicability." However, critiques of this stance exist, suggesting that the assumptions made of how an organization is operating do not always fit with the university operations (Cunningham, Tapsall, Ryan, Stedman, Bagdon, & Flew, 1998). Heiskanen, Newman, and Similä (2000) found industry best practice standards in ERP packages to be inappropriate for universities due to their unique and impossible-to-model structures and decision-making processes. Their argument draws on the first authors' significant experience in managing IT in Finland's largest university. Several organizations are, nevertheless, still adopting ERP packages and deciding to match their organizations to the systems rather than the other way around (Davenport, 1998; Markus, Axline, Petrie, & Tanis, 2000; Koch, 2001).

The Allen and Kern (2001) study of four ERP implementations in UK universities found that the ERP projects placed the universities in complex relationships with the ERP vendors and implementation consultants. Furthermore, the academic culture in universities made it particularly hard to implement such large systems. McConachie (2001) found that university staff wanted "a" system but were afraid of the complexity of an ERP system. Chang, Gable, Smythe, and Timbrell (2000) looked at the importance of knowledge management in ERP implementations in the public sector in Australia. They concluded that knowledge management had to be taken into account to successfully implement an ERP system. Many universities are implementing ERP systems, as a solution to their information systems needs, with varying results in terms of success.

The significance of the cases presented in this book are underlined by the recent production of another book that provides a collection of 18 research papers from academics around the world, examining the use of ERP to improve existing business processes (Shanks, Seddon, & Willocks, 2003). Cases highlighted in this book include a much-publicized disaster-ridden implementation at the Royal Melbourne Institute of Technology (RMIT). The problematic PeopleSoft Academic Management system implementation was reported (Turner, 2004) to have had significant issues "with virtually every aspect of the implementation of the $47 million software system that went live in October 2001." It was suggested that the university "did not manage the project appropriately, had a poor implementation plan, little senior management involvement,

poor corporate governance and a lack of accurate documentation." This case is by no means unique, with further evidence of ERP failures within universities brought about by recent media interest.

The attorney general of Ohio laid charges on behalf of Cleveland State University against the ERP vendor PeopleSoft and its consulting partner Kaludis Consulting Group for "failing to fulfill its contractual duties." More than US$130 million is sought for compensatory and punitive damages (Gilbert, 2004). With the student administration system being a source of many problems, administering student financial aid and keeping student records in sync caused irreparable damage.

Due to the pervasiveness of ERP adoptions within the higher education sector (including 36 out of a possible 42 adoptions by universities in Australia in 2002), and more traditionally within the corporate environment, ERP systems are of interest to a wide range of professional and scholarly communities, in addition to the academic fields of information systems (Esteves & Pastor, 2001), where many cases have been reported.

Organization of the Book

Although the editors' original objective was to focus on ERP implementation in the higher education sector, our call for papers attracted a number of interesting contributions discussing other sectors. The chapters are characterized by their references to a number of seminal studies in information systems research.

Section 1 consists of a variety of ERP implementation approaches, including two contrasting grounded theory investigations, a study of communication during the implementation, a health-sector case using relational governance, and a description of ERP implementation in a complex environment of a consolidated college system.

The chapters in Section 2 all refer to Lynne Marcus's paper on information systems implementation (1983) and provide further illustration of the significance of the interaction between organizational and technical factors in information systems implementation.

The chapters in Section 3 are concerned with critical success factors and the perceptions of information systems success. The content relies heavily on the DeLone and McLeod model of information systems success (1992 and 2003).

Section 1: ERP Implementation Approaches

In Part 1, five different ERP implementations are discussed, including those of universities on both sides of the Atlantic (the United States, Spain, and Israel), a community and technical college system in the United States, and a Western rural hospital. Apart from Chapter 4, they all report substantial research studies critiquing the respective implementation approach. Chapter 4 illustrates PeopleSoft implementation into a complex administration of a recently consolidated college system and the benefits the college achieved through ERP.

In Chapter 1, "Sociotechnical Aspects of ERP Implementation: The Central Role of Communication," Dov Te'eni investigates development and appropriation of ERP (Oracle®) as a collaborative effort that relies on communication for its success. The consequences of communication problems of the implementation of human resource and student information systems modules are illustrated, including the escalating costs due to the delays and unacceptable level of service to the university personnel who did not receive their appointments in time. An analysis of the communication problems demonstrates how communication is affected by the organizational context and how communication affects ERP success. The chapter looks at content and form of communication by utilizing a framework for researching communication (Urquhart, 2001) and extends this framework for investigation of the gap between the sender and receiver prior to the communication, recognizing the different interests of the developers and the users.

Actual incidents of communication breakdowns are used to clarify the impact of communication gaps and communication complexity on mutual understanding and relationships between communicators. The chapter also discusses how these factors affect critical success factors of ERP, such as commitment and involvement, user acceptance, and monitoring and feedback. Examples are given of effective communication forms, and advice on how to develop these "effective" forms of communication is provided.

An important implication is that communication in ERP has to be structured and managed. The qualitative methodology employed relies on records of the communication between the actors, so that for the researcher, communication also tells the story of the collaboration between the ERP actors. It is suggested that communication complexity and breakdowns can serve as diagnostic tools that should alert management to take corrective action to improve involvement and user acceptance and to stop the growing resistance.

Chapter 2, "Postimplementation Use of a Complex Technology: The Case of a Southeastern U.S. University" by Marie-Claude Boudreau reports on a substantial qualitative research study conducted within a Southeastern U.S. university. The study investigated how organizational members appropriated an ERP package (PeopleSoft) over time.